Unemployment and Non-Employment:

Heterogeneities in Labor Market States*

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Abstract

The determination of how to distinguish between unemployment and non-participation is important and controversial. The conventional approach employs *a priori* reasoning together with self-reported current behavior. This paper employs an evidence-based classification of labor force status using information about the consequences of the behavior of the non-employed. We find that marginal attachment—defined as desiring work, although not searching—is a distinct labor market state, lying between those who do not desire work and the unemployed. Furthermore, there are important heterogeneities within these non-employment states. Two subsets of non-participants—both engaged in "waiting"—display behavior similar to the unemployed.

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I. Introduction

The determination of which of the non-employed to count as unemployed is a central task for statistical agencies worldwide, and an important question for research and policy.[1] The non-employed may be a heterogeneous group, ranging from those with a strong attachment to the work force to those with little or no attachment. The conventional criteria for dividing the non-employed are principally "availability for work" and "job search," with those who are available for and looking for work classified as unemployed (U), and the remainder as out-of-the-labor force (O). The employed (E) and unemployed constitute labor force participants.

While such classification has proven useful for monitoring and analysing economic and labor market developments, any simple division into two states is unlikely to adequately capture the diversity of individual behavior. *Within* the standard categories there may be significant heterogeneity. Some unemployed may be more eager to find work, and some non-participants may have a stronger attachment to the work force than others. Because of these difficulties, countries differ in how they implement concepts such as availability for work and job search. In addition, in many countries there have been changes over time in the definitions used.

Several examples illustrate these differences. The United States requires "active job search" for classification as unemployed whereas in Canada and other countries any search method—including only "passive search"—is sufficient (see Zagorsky 1996; Macredie 1997). Another example is that of "discouraged workers," defined as those who report that they want work but are not searching because they believe that no work is available. Discouraged workers

[1] See, e.g., the President's Committee to Appraise Employment and Unemployment Statistics (1962), the National Commission on Employment and Unemployment Statistics (1979), the Organization for Economic Cooperation and Development (1987, 1995), and Statistics Canada (1999).

were, at least in principle, included among the unemployed in the United States prior to 1967 and in Canada prior to 1975 but now are classified as out-of-the-labor force.[2] The treatment of full-time and part-time students is another area in which countries have adopted different procedures.[3] A final example is that of "(short-term) future job starts"—those who report that they were not searching because they had a job to start within the next 4 weeks. Such individuals were classified as unemployed in the U.S. prior to 1994 but are now included among non-participants. In Canada, as in many countries, this group is classified as unemployed.

There are many reasons why such measurement issues are important. Considerable attention is paid to small changes in the unemployment rate, and to cross-country differences in such rates. Measurement is central to such discussion. Much analysis addresses durations in various non-employment states, and the measurement of such spell lengths—particularly in the presence of multiple classification changes within a single non-employment spell—is critical for this work (see, e.g., Hall (1970), Clark and Summers (1979)). Macroeconomic fluctuations in labor markets are affected by cyclical participation and labor force withdrawal, with the main changes being driven by individuals on the margin of the current classifications. Finally, flow-based analysis of labor markets often replaces job search with the idea of "*waiting*" for new jobs to emerge (see, e.g., Blanchard and Diamond (1992)). Random matching of workers and jobs is replaced by "stock-flow" matching, as in Coles and Smith (1998). This flow-based approach does not square well with a measurement system based chiefly on job search.

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[2] In practice, in both countries it is unclear to what extent discouraged workers were included among the unemployed.

[3] See Statistics Canada (1998) for details on current differences between Canada and the United States.

The conventional approach to these measurement issues has been to employ *a priori* reasoning about appropriate definitions together with self-reported behavior of survey respondents. Most countries use job search (rather than a weaker criterion such as the expressed desire for work) based on the idea that those looking for work display by their behavior a strong attachment to the labor force. On this view, those who say they desire work (but are not searching) do not display enough attachment to the labor force to warrant being classified as unemployed. Thus, discouraged workers would be more appropriately classified as non-participants than as unemployed. Similarly, this approach may justify the requirement of "active job search" for unemployment, thereby treating those using only "passive search"—such as "looking at job ads"—as non-participants.

The conventional approach has some merit in that classifications are based on observable activities (or at least self-reports thereof). This method of measuring labor force activities has become widely used, including recent adoption in many European countries that previously relied on administrative data. However, debates about appropriate definitions cannot be resolved by appealing to *a priori* reasoning about what constitutes evidence of sufficiently strong desire for work. For example, whether discouraged workers should be treated as unemployed or non-participants cannot be resolved without some appeal to evidence.

In this paper we employ an evidence-based classification of labor force status using information about the consequences of the behavior of the non-employed. We classify individuals in the same labor force state if they display equivalent behavior in terms of their *subsequent labor force status*. For example, one might regard two groups as being equally attached to the labor force if they are equally likely to be employed in a subsequent period. Our

approach generalizes this intuitive notion to all labor force states and involves examining the transition behavior of various subsets of the unemployed and non-participants.

We address these issues using Canadian Labour Force Survey (LFS) data for the period 1997-2000. The LFS underwent a major revision effective January 1997 and use of these new data permits us to examine several important issues that have not previously been addressed. The LFS now contains evidence on alternative measures of labor force attachment (such as a professed "desire for work") *each* month. Seasonal factors play an important role in labor market activity, and analysis of seasonality was beyond the scope of earlier work.[4] For this analysis we have access to a unique data set in which the LFS public use file is augmented by information on labor force status and job search for all subsequent months that each respondent remains in the survey. Since LFS respondents are surveyed for six consecutive months, this permits investigation of behavioral outcomes 1 to 5 months beyond the initial survey date. (In past work, the linkage was only for one month into the future.) As a consequence, we can observe various labor market states as both origin and destination states. In particular, if we adopt the four-state model that divides the out-of-the-labor force group into two subsets according to desire for employment, the augmented LFS data permits assessment of transitions between any pair of these states. Finally, the new LFS provides more information on heterogeneity within labor market classifications than was previously available, so we can assess a wide range of classification procedures. For example, we analyze here "temporary layoffs" and "future job starts," categories not examined in previous work.

[4] The Survey of Job Opportunities 1979-92 used in earlier work had such information only for March (and, for two years, September).

Our main results are as follows. Marginal attachment (M) to the labor force—defined as having an expressed desire for work, although not currently searching—is a distinct labor market state, lying between the non-attached (N))—those who report that they do not desire work—and the unemployed. Furthermore, there are important heterogeneities within each of the three non-employment states U, M and N. Within U, job searchers are distinct from both temporary layoffs and (short-term) future job starts, having lower transition probabilities into employment and much higher probabilities of remaining unemployed. Within M, the "waiting" sub-category displays very strong attachment to the labor market, moving into jobs at a faster rate than the unemployed. These individuals are currently classified as out-of-the-labor force. In contrast, the non-waiting sub-categories of M are distinct from the waiting group, and fall midway between U and N in terms of labor force attachment. Finally, within N, individuals classified as long-term future job starts—those with jobs to start more than a month ahead —transit into employment *in the next month* at a rate that is an order of magnitude higher than the average rate for the balance of the N group, and at a rate higher than that of the officially unemployed. Furthermore, formal tests of equivalence of M(Waiting) and U and N(LTFS) and U do not consistently reject equivalent behavior. Our interpretation is that these results warrant reassessment of whether members of both the M(Waiting) and N(LTFS) categories are best classified as non-participants.

II. Methodological Overview

The methodology underlying this research can be summarized in the context of a Markov model of labor market states and transitions.[5] Consider four distinct labor market states: employment E, unemployment U, marginal attachment M and not-attached N. States E and U

[5] Note, however, that the method can accommodate non-Markovian behavior, such as when transition probabilities exhibit dependence and vary with the elapsed duration of a spell.

use conventional definitions, while M and N are obtained by dividing non-participants O into two subsets, defined in various ways. One approach we employed in earlier work defines M as those persons who, although not currently searching, report that they "want a job."

Given this structure, assessment of the equivalence of two labor market states amounts to testing whether the transition probabilities out of the two states are equal, either unconditionally or conditional on a set of explanatory variables.[6] For example, denoting the transition probability from M to E as pME, and analogously for other states, a test of the equivalence of M and N amounts to assessing whether the conditions

$$pME = pNE \qquad (1a)$$

$$pMU = pNU \qquad (1b)$$

jointly hold. If so, M and N are equivalent from this behavioral standpoint and the usual breakdown of activities into three states, E, U and O (=M+N), would be appropriate.[7]

Similarly, a test of the equivalence of U and M would be whether the conditions

$$pUE = pME \qquad (2a)$$

$$pUN = pMN \qquad (2b)$$

jointly hold. If true, there is no behavioral difference between those searching for work and those who want a job but are not searching, implying that unemployment classification should be based on the desire for work rather than on job search.

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[6] Flinn & Heckman (1983) is the basic reference on this approach. See also Tano (1991), Gönül (1992) and Jones & Riddell (1999). Related examples of the use of subsequent labor market status for the analysis of search behavior include Bortnick and Ports (1992) and Osberg (1993).

[7] Note that the test of equivalence involves exit rates into states other than those being tested.

If both pairs of restrictions are rejected, then both U and M and M and N are distinct states in terms of labor market behavior. It may nonetheless be possible to order the states in terms of their degree of labor force attachment. For example, one might find that pUE > pME > pNE and pUU > pMU > pNU and pUN < pMN < pNN, meaning that M represents an intermediate state between U and N. [8] The marginally attached are more likely to obtain employment than the non-attached, but less likely to obtain employment than their unemployed counterparts, while the probability of labor force withdrawal is least for the unemployed and greatest for the non-attached. Such a finding would indicate that the marginally attached are distinct from the unemployed but nonetheless are closer to the unemployed in terms of their degree of labor force attachment than are the non-attached.

Analogous to this example, our procedures permit testing the equivalence of a variety of states, including sub-categories of the unemployed (e.g., temporary layoffs and job searchers) and sub-categories of the marginally attached (e.g., according to the reason for not searching). In addition, it is possible to estimate models of the determinants of these transitions and to test the framework conditional on this model structure and the associated explanatory variables.

We also investigate the structure of transition probabilities over a *longer* time frame, exploiting the advantages of the augmented LFS data. Hazards into employment are examined at months 2 to 6 after the survey date, disregarding whatever happens in any intervening months.

[8] In our earlier research (Jones and Riddell, 1999), we were able to observe 4 states (E,U,M,N) in the origin month but only 3 states (E,U,O) in the destination month so we were not able to fully order the non-employment states. However, we did find that pUE>pME>pNE and pUU>pMU>pNU and pUO<pMO<pNO.

III. Data Overview

The data are drawn from the Canadian LFS and cover the period 1997-2000. This revised LFS includes detailed questions on the activities of the non-employed.[9] Our approach uses linked records that match an individual's responses in one month to their labor market outcomes in subsequent months. This linkage utilizes the feature that LFS respondents remain in the survey for six consecutive months. Hence, 5/6ths of the sample can be matched to the same individuals in the next month, 4/6ths of the sample two months from the starting month, and so on.

The present data are superior to those used in our earlier research because of the longer time horizon and because more detailed information on the non-employed is available in each month. In contrast, Jones and Riddell (1999) used the Survey of Job Opportunities (SJO) matched to one month of the subsequent LFS (using the pre-1997 LFS design), and had different information available for the SJO origin states than for the LFS destination states. This led to some econometric limitations and to some hypotheses of interest not being testable.

IV. Empirical Results

We begin with transitions between *broadly defined* labor market states, and examine the effect of lengthening the horizon. We then use more finely graded origin states, addressing the heterogeneity of sub-categories of standard labor market states. Since these simple results are very informative, we present much of this data graphically. We later report econometric results that, to a very large degree, confirm the expectations established by the unconditional data.[10]

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[9] For a description of the LFS and the 1997 version of the survey instrument, see Statistics Canada, Household Surveys Division, Labor Force Survey Sub-division, *Guide to the Labor Force Survey*.

[10] Further details of our statistical results are reported in the working paper, Jones and Riddell (2002).

a. Transition Behavior from Three Non-Employment States

We begin with average transition rates between origin states (U, M, N) and destination states (E, U, M, N) together with the composite non-participation O=M+N. In Table 1, the first panel shows the average hazard for adjacent months. For transitions into employment, there is a clear difference between U and M as origin states, with the hazard from unemployment being 23%, almost double that of the marginal group (12%). In addition, though, there is a clear difference between the M and N groups, with the hazard pNE being only 3.5%. These differences are numerically large, and are consistent with earlier results.[11]

The remainder of the first panel in Table 1 shows the pattern of adjacent month hazards into the three non-employment states, as well as into O=M+N. For each destination, there is a clear difference between origin states U and M and between M and N. For the hazard into U, the average from M is 21%—an order of magnitude higher than the pNU hazard (2.4%)—while for transitions into N, pMN is 34% while pUN is 13%. The diagonal elements (pUU, pMM, and pNN) are large and examination of these suggests that M is the least stable state, with only a one-third chance of remaining in the marginal state from one month to the next, while N is by far the most stable. Overall, the pattern of the non-employment hazards is congruent with the hazards into employment in that U, M and N exhibit markedly different behavior. Furthermore, there is a clear ordering of the non-employment states, with pUE > pME > pNE, as well as pUU > pMU > pNU, and pNN > pMN > pUN, suggesting that M is an intermediate state between U and N.

[11] In work based on the SJO-LFS match, we found adjacent month-to-month hazards of 18%, 12% and 3% for pUE, pME and pNE respectively for the period 1979-81 and 16%, 12% and 3% respectively for 1984-91 (Jones & Riddell, 1999, p.154).

Figure 1 plots the hazards from non-employment into employment in the next month. There is a clear separation with pUE > pME > pNE in *every* month. Some of the variation is seasonal, such as the spike in pUE each summer, and some is due to sampling variation.

The remaining panels of Table 1 report the average transition probabilities at longer horizons. At each interval between origin and destination months, the transition patterns are consistent with the adjacent month results. All probabilities into employment rise at longer horizons, but the ranking pUE > pME > pNE is maintained. The standard errors rise as the sample size falls, but these differences remain significant even at a 6-month interval.

The other elements of the average transition matrix also display consistent patterns as we move to longer horizons. There is more mobility at longer intervals, so that the diagonal elements pUU, pMM and pNN fall in the lower panels of Table 1. This effect is more pronounced for U and M than for N, while the hazard from U into O rises slightly as the interval increases. At every horizon, though, the rankings pUU > pMU > pNU and pNN > pMN > pUN clearly hold, consistent with the view that M is an intermediate state between U and N.

b. Transition Behavior from Sub-Categories of Unemployment

The first panel of Table 2 reports adjacent month transitions from three unemployment sub-categories, temporary layoffs (TL), job searchers (JS), and (short-term) future job starts (FJ). Figure 2 also plots transition rates for these sub-categories over longer horizons.

For transitions into employment, the FJ group has the highest hazard at 70%, compared with 19% for job searchers. Although these series vary through time, the monthly ranking is consistently that FJ unemployed are more likely to move into employment than TL unemployed, who in turn are more likely to become employed than the JS group. These differences in the pUE hazards are largely counterbalanced by differences in the pUU hazards for these sub-

categories. This leaves only small monthly probabilities of moving from any of these unemployment sub-categories to either M or N. Although there is no clear ranking of the pUM and pUN hazards for the TL and FJ sub-categories, the JS sub-category indicates the lowest labor force attachment in that the transition probability into M and N is highest for this group.

Longer horizon results are summarized in Figures 2 and 3. Figure 2 presents transition rates from each U sub-category into E and U. At each horizon, the FJ group is most likely to move into employment and least likely to remain unemployed, although the TL hazard rises significantly as the horizon lengthens. The JS group also has a rising hazard into employment, with the transition rate doubling from the two-month to the six-month gap. This pattern is again matched by a falling probability of remaining unemployed as the horizon extends.

Figure 3 shows longer horizon results from the three U sub-categories into the non-participation states M and N. None of the transition rates into M varies with the horizon, but both FJ and JS display hazards into N that rise with the gap between origin and destination.

Overall, these results indicate that those classified by the LFS as temporary layoffs and future job starts have a very strong attachment to the labor force, a finding that clearly supports current practice of inclusion of these two groups among the unemployed.

c. Transition Behavior of the Marginally Attached by Reasons for Not Searching

The marginally attached group consists of individuals with various reasons for simultaneously reporting no job search and a desire for a job. The new LFS data permit disaggregation of the M group by reason for not searching, the four sub-categories being Waiting M(W), Personal M(P), Discouraged M(D), and Other M(O). The Waiting group includes those "Waiting for replies or recall"; Personal includes "Own illness or disability," "Caring for own children," "Other personal or family responsibilities," and "Going to school." Discouraged

refers to those not searching because "Believes no work available." In our earlier work, we found important heterogeneity within the marginal group, and the augmented LFS data allows us to investigate this issue more fully here. We also report results for the aggregated "Non-Waiting" group (Personal + Discouraged + Other). [12]

The second panel of Table 2 reports hazards by "reasons for not searching" and Figure 4 graphs longer horizon results from these M sub-categories into employment. The striking result in Table 2 is that the "Waiting" group's transition rate into E is much higher than that of the other sub-categories or the combined "Non-waiting" group. The Waiting hazard averages 28% (and exhibits monthly values in excess of 40%), in contrast to the other three hazards that average in the 7-11% range (9% for the non-waiting group as a whole). This difference is consistent with the importance found for the waiting group in our earlier work. These results indicate that the waiting group exhibits stronger attachment to the labor market than the remainder of those who state that they desire work. As shown in the third panel, the higher value of pM(W)E is accompanied by a much lower hazard into N, so the waiting group is both *more* likely to move into employment and *less* likely to leave the labor force than the rest of the marginal category.

The behavior of this group at longer horizons is shown in Figures 4 and 5. The key result in Figure 4 is simple and striking. While the three Non-waiting sub-categories have transition rates into employment that rise gradually with the horizon, the Waiting sub-category rises to a much greater extent, with its value exceeding one-half by the longest horizon. If we compare these hazards with their counterparts from the unemployed (in Figure 2), pM(W)E clearly

[12] One reason why we observe individuals who report that they are not searching because they are expecting recall to a former job, yet who are not classified as "temporary layoffs," is that in Canada those awaiting recall to a *seasonal* job are not treated as on temporary layoff.

exceeds pU(JS)E at each horizon. The Waiting sub-category displays *more labor force attachment than job searchers*, the core of the unemployed.

Also noteworthy is the behavior of Discouraged workers, a group that has traditionally received considerable policy attention. Our results in Table 2 show surprising similarity between pM(D)E and the other non-waiting hazards (pM(P)E and pM(O)E). Figure 5 reveals one key difference: the discouraged are the most stable sub-category, with a likelihood of remaining marginally attached (pM(D)M) over 40% in adjacent months. This figure falls as the horizon lengthens, but remains distinct from the diagonal transition probabilities for the other three M sub-categories. However, the results in the third panel of Table 1 show that there is not much difference between the hazards into N for the Discouraged and Other sub-categories, both of which lie below that for Personal and above that for Waiting. These conclusions are supported by the longer horizon transitions graphed in Figure 4. Overall, this evidence does *not* support the view that Discouraged workers constitute a distinctive sub-category of the marginally attached.

In conclusion, there is considerable evidence to support including the waiting sub-category of marginal attachment in supplementary measures of unemployment. Indeed, this group displays stronger labor force attachment than the officially unemployed. This evidence suggests that this group should be considered for classification as unemployed.

d. Transition Behavior for Long-Term Future Job Starts and Other Non-Attached

A further set of measurement issues arises for individuals not engaged in job search who have a job to start *more than* four weeks away. In Canada, as in many other countries, such individuals—referred to as long-term future job starts (LTFS)—are categorized as O, absent the usual job search and availability criteria for categorization as U. They are hence treated differently than individuals with a job to start within four weeks (who do not have to engage in

search to be treated as unemployed). The final panel of Table 2 reports transition rates for this group and for the rest of the not attached and Figure 6 graphs related longer horizon hazards.

The LTFS group displays a large hazard into employment (in the *next* month); at 27%, it is essentially an order of magnitude higher than that of the NA. The LTFS also have a high transition rate into unemployment, about 22%, compared with 2% for the NA. Most of these differences are associated with a much lower probability (under 50%) of remaining in N, compared with a probability of 93% for the NA. Moreover, the behavior of the averages reported in Table 2 is also reflected in the time series hazards, where LTFS is clearly distinct from the NA every month. There is therefore considerable heterogeneity within the N group.

Direct comparison of the LTFS group with the marginally attached, as in Figure 6, shows that the LTFS members have a higher probability of entering employment, although the two groups have fairly similarly average hazards into unemployment.[13] Thus, based on employment and unemployment outcomes in the next month, the LTFS group is certainly more strongly attached to the labor force than the remainder of the non-attached. In addition, they exhibit greater attachment than those who state that they want work. Indeed, the LTFS group has a higher transition rate into employment than those classified as unemployed, and a likelihood of being employed in the following month that is similar to that of the marginal waiting group.

The definition of the LTFS group, with the specification that the job start be *more than four weeks* ahead, raises a question about behavior in *subsequent* months. These results, presented in Figure 6, are consistent with those for adjacent months. In each subsequent period, the transition rates into E for LTFS are above those for the NA and the M groups. Similarly, the

[13] In the monthly data, the pN(LFTS)U series is more choppy than the pMU series, probably as a consequence of sampling error, but their central tendencies are very similar.

results for employment at any subsequent date show pN(LTFS)E>pME in every month. Thus longer-term employment outcomes reinforce the conclusion that the LTFS group exhibits much stronger attachment to the labor force than the remainder of the non-attached category, and stronger attachment than those who state that they desire work.

V. Equivalence Testing and Implications

a) Conditional Models of Equivalence of Labor Market States

The average transition probabilities presented above pool individuals who differ on many dimensions. It is important to assess whether the results are principally a consequence of compositional effects—so that different types of individuals are more likely to be in some states than are others, with implications for transitions out of these states—or whether the results also hold after controlling for these influences. We therefore estimate multinomial logit models of the determinants of transitions into employment and the non-employment states. These models allow tests of restrictions such as (1a) and (1b) and their analogs for heterogeneity within labor force categories. Essentially, the method examines whether two different origin states (such as M and N) yield estimated coefficients that are significantly different from one another. Equivalently, we are testing whether we could *pool* the two origin states, and employ a common model for these transitions. If the estimated coefficients are not significantly different, then we will regard the two states as behaviorally equivalent. Conversely, if we reject pooling, we conclude that the states are behaviorally distinct.[14]

[14] Use of a multinomial logit procedure raises the issue of the independence between the possible outcomes, and of whether, e.g., the relative transition rates into E and U would remain unaltered were the option of remaining in M or N removed. We have therefore also estimated binary logit models of

The econometric results overwhelmingly reject pooling.[15] For the basic tests of U=M and M=N equivalence, we reject the null hypothesis separately for each pair of adjacent months in the sample, as well as when we pool the months together in one composite test. For assessment of the equivalence for sub-categories of non-employment states, the pattern of results is similar. Within unemployment, we reject the equivalence of job search and non-search (temporary layoff or short-term future job starts), and we also reject the equivalence of each of the three U sub-categories (job search, temporary layoff, and future starts). These results hold for each pair of adjacent months. Within the marginal group, as expected, we reject the equivalence of the waiting and non-waiting sub-categories. We also reject the more stringent hypothesis that each of the marginal sub-categories (Waiting, Discouraged, Personal, and Other) are equivalent. Finally, we test and mostly reject the hypothesis that long term future job starts are equivalent to the non-attached within the N category. In this final case, however, relatively small sample sizes mean that these estimates and associated test statistics do not converge for all of the pairs of adjacent months, notwithstanding the huge differences in average hazards.

In addition to these assessments within sub-categories of non-employment states, we perform three *mixed* tests of equivalence that compare labor market sub-categories across the traditional lines of classification. We earlier reported considerable heterogeneity within the marginal group, with the waiting sub-category displaying a probability of entering employment in excess of that of the unemployed. The likelihoods of the marginal waiting group and the officially unemployed exiting to non-attachment are also quite similar, so it may be appropriate

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transition rates into employment alone, and the pattern of test statistics is very similar in that case. None of the qualitative results is altered by using tests based on binary logit models.

[15] The working paper Jones & Riddell (2002) gives the test statistics that are summarized here.

to pool U and M(W) into a broader category of "unemployment." A related mixed test is to compare conventionally defined U with the LTFS subset of N. On average, the transition rate from N(LTFS) to employment is somewhat higher than the transition rate from unemployment. In addition, members of the LTFS group also have relatively low probabilities of remaining non-attached (compared to the high degree of stability displayed by the balance of the N group).[16] Again, there is a prima facie case for assessing whether N(LTFS) and U are behaviorally equivalent. The final mixed test compares the groups M(W) and N(LTFS) directly.

The results for these three mixed tests are quite different from those reported above. The null hypothesis of equivalence of U and M(W) is not rejected at the 1% level in one-third of the adjacent month pairs, while in the remaining two-thirds, the rejections are not decisive as in previously reported tests. We conclude that U and M(W) are similar but not identical states in terms of their transition behavior. Our basis for this conclusion is two-fold. First, although equivalence is rejected in a majority of samples, the rejections are not strong and a significant minority of tests do not reject. Second, to the extent that formal tests reject equivalence, it is principally because pM(W)E > pUE rather than the reverse. The average transition rates into the other pure destination state, pUN and pM(W)N, are not significantly different from each other. Thus in terms of exit rates into E and N, the marginal waiting group displays similar, or somewhat higher, attachment to the labor force than those officially classified as unemployed.

Equivalence of U and N(LTFS) is rejected in most of the adjacent month samples, but the rejections are not strong and in a small minority of months the null hypothesis is not rejected.

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[16] The average rate at which N(LTFS) members *remain* as N(LTFS) month-on-month is 24%, compared with the diagonal transition probability for the N(NA) of 93%.The full matrix of transition rates and associated standard errors is reported in Jones and Riddell (2002).

These results accord with the average transition rates (and their standard errors) in Table 2 that suggest that U and N(LTFS) have similar degrees of labor force attachment. Thus, LTFS display somewhat stronger attachment on the basis of movements into employment but weaker attachment on the basis of labor force withdrawal. Although the moderate differences in transition rates result in formal rejection of equivalence in the majority of samples, N(LTFS) is distinctly different from the remainder of the non-attached category, NA, as well as from the non-waiting subset of the marginal attachment group, M(NW). As is the case for M(W), the N(LTFS) is much more similar to the officially unemployed than to other labor force states.

Lastly, our tests reject equivalence of M(W) and N(LTFS) in almost all adjacent months, although for these two states the average transition rates into employment are very similar and are not statistically significantly different from each other. These rejections reflect a higher likelihood of labor force withdrawal (exit into non-attachment) for the future job starts group.

A final issue is whether this pairwise non-equivalence of U, M(W) and N(LTFS) in the majority of months supports keeping these states distinct in the reporting of labor market statistics. Note that the three groups within the official definition of U are also behaviorally distinct, but are nonetheless aggregated based on *a priori* views about what constitutes strong attachment to the labor force. Ultimately, given that a small number of states is desired for economy of reporting and interpretation, the issue may come down to which sub-categories are best grouped together. In this light, the salient characteristic of both M(W) and N(LTFS) is the very high transition rate into employment. Based on this both groups are arguably better

classified as unemployed rather than out-of-the-labor force.[17] The fact that for both groups the transition rate into non-attachment is similar to that of the unemployed reinforces this view.

b) Implications for Alternative Measures of Unemployment

These results suggest several alternative measures of the unemployment rate.[18] We examine whether use of such alternative measures would alter patterns of unemployment experience across different demographic groups, relative to the conventional definition.[19]

We consider six measures as follows. UR1 is the conventional definition U/(E+U). UR2 and UR3 respectively add the marginal waiting group M(W) and the long-term future job starts group N(LTFS) to the numerator and denominator, and UR4 adds in *both* of these groups. UR5 adds in all of the marginally attached, so UR5 = (U+M) / (E+U+M), and UR6 augments UR5 by the addition of the N(LTFS) group to both numerator and denominator. We calculate these six measures for various sub-groups, and examine whether use of such alternative measures alters the conventional view of how unemployment varies across population sub-groups.

We begin with a summary of results by sex and age. Female unemployment rates are below those for males for measures UR1-UR4, but this ranking is (slightly) reversed for UR5 and UR6. By age, the ratio of youth (ages 15-24) to adult (ages 25-64) unemployment rates averages between 2.1 and 2.2 for the 1997-2000 period, but is essentially invariant to which of the UR1-UR6 measures is adopted.

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[17] Over the 1997-2000 period, the average unemployment rate would rise from 8.0% to 8.4% if the M(W) group were treated as unemployed, and to 8.7% if LTFS were also classified as unemployed.

[18] Compare the official set of supplementary measures elaborated in Statistics Canada (1999).

[19] In order to conserve space, details are available in Jones and Riddell (2004).

We also address unemployment experience by education, using high school graduates as the benchmark. Among individuals with only elementary education, relative unemployment rates range from 1.6 to 2.0, with the key difference being that the relative rate is higher for measures UR5 and UR6 than for UR1-UR4. Among those with some secondary education (but less than high school graduation), this pattern is maintained, so that marginal attachment and long term starts are disproportionately important for these less educated groups. Conversely, among individuals with university education, the pattern of these relative ratios reverses. More educated groups have lower relative unemployment rates, averaging between 0.4 and 0.7 of those of high school graduates, but the UR5 and UR6 figures now lie *below* those for UR1-UR4.

In addition, we address regional variation in the 10 provinces and report the pattern of results relative to Ontario. Some provinces exhibit little variation in relative unemployment rates as we consider narrow to broad measures of unemployment. For example, Alberta's unemployment rate averages 0.82 of the Ontario rate, and this figure is essentially invariant to the UR1-UR6 measure adopted. Similarly, BC has an average of just over 1.2 using each of the UR1-UR6 definitions. However, in other cases, there are interesting differences. Quebec, Manitoba and Saskatchewan each show some variation in unemployment experience, relative to Ontario, as the scope of the unemployment measure varies. These differences are most pronounced in the Atlantic provinces. In Newfoundland and New Brunswick, both of which have substantially more unemployment than Ontario, the broader measures (UR5, UR6) show substantially higher relative unemployment, averaging around 3.3, than does the conventional measure which averages about 2.6. However, UR3 is approximately equal to UR1 for these provinces, while UR2 and UR4 are both higher (around 3.0). The marginal Waiting sub-category, and the whole Marginal group, matter more for these figures than does the long-term

future job start group. Nova Scotia's pattern of relative rates for UR1-UR6 matches those for Newfoundland and New Brunswick, though the differences are smaller in magnitude.

Finally, we have also calculated these alternative measures at the sub-provincial level of Employment Insurance (EI) region. Local labor market conditions in these 55 regions affect EI qualification requirements and length of EI eligibility. Since measures of unemployment at this regional level affect benefit entitlements, there is natural interest in knowing the extent to which alternative measures such as UR1-UR6 would alter program provisions.

The broad pattern of these EI region results is that, for most regions, the relative unemployment rates do not vary markedly from one another. Relative to the (benchmark) Ottawa region, most EI regions have quite stable values across UR1-UR6 when averaged over the 1997-2000 period. Vancouver's figures range from 1.12 (UR1) to 1.08 (UR6), for example, while Montreal's analogous figures are 1.39 and 1.33. In Newfoundland and Labrador, the relative rates go from 3.19 to 4.09, but such variation across UR1-UR6 is rare. Overall, contrary to our prior expectation, the regional structure of unemployment during this sample period is not be substantially altered by use of these alternative measures of unemployment.

VI. Conclusions

This paper applies current methodology and techniques to study labor force attachment using the best and most recent Canadian data, drawn from the LFS 1997-2000. We apply this approach to address heterogeneities in labor market states and thereby to assess the appropriate allocation of individuals to alternative states. The method relies on use of behavioral outcomes to determine an appropriate set of labor market categories. The central idea is that individuals in one group are classified as being more attached to the labor force than those in another group if they display a greater likelihood of being employed in the future, and a lower probability of labor

force withdrawal. We believe that this approach is an important supplement to existing methods of categorization that rely chiefly on self-reported current information, although we do not claim that this evidence alone can necessarily resolve all of these contentious issues.

The principal results of applying this methodology to the recent LFS data are as follows.

1. Dividing the non-employed into three sub-categories, unemployed (U), marginal attachment (M), and not-attached (N), there is a clear behavioral difference between each of these sub-categories. The unemployed move into jobs much more quickly than the marginally attached, who in turn transit into employment (in the next month) with a probability approximately four times that of the not-attached group.

2. Differences among the non-employment states U, M and N in their transition probabilities into employment are quite stable over time in recent years and are consistent with our earlier research.

3. Differences in transition rates into employment are matched by analogous movements into the non-employment states U, M and N. Based on formal tests of equivalence, we conclude that M is a distinct intermediate state between U and N in terms of labor force attachment.

4. Evidence from longer time horizons (in months 3 through 6 after the initial survey) is consistent with findings from the adjacent month data.

5. Among the unemployed, the (short term) future starts group has the greatest hazard into employment, followed by those on temporary layoff, with job searchers as a whole having a lower transition probability into employment. Temporary layoffs and future job starts are also less likely to exit the labor force than are job searchers. These results support the current practice of including temporary layoffs and future job starts among the unemployed.

6. Within the marginally attached group, there is substantial heterogeneity. The “waiting” sub-category has a substantially higher transition probability into employment, and a substantially lower likelihood of exiting into non-attachment, than is the case for the remainder of the marginal attachment group. This evidence indicates that those who state that they desire work but are not searching because they are “waiting for recall or replies” deserve strong consideration for inclusion in supplementary measures of unemployment. Indeed, comparison of M(W) and U suggests that the waiting group should be treated as unemployed rather than out-of-the-labor force. In particular, their average transition probability into E exceeds that of those officially classified as unemployed and their average transition rate into N is not significantly different from that of the unemployed. Formal tests reject equivalence of U and M(W) in the majority of months; however, the rejection arises because the marginal waiting group displays somewhat stronger labor force attachment than the unemployed, rather than the reverse.

7. There is not a substantial difference in terms of subsequent labor market behavior between "Discouraged" workers and the balance of the marginal category.

8. There is significant heterogeneity within the not-attached group. The principal reason is the high degree of attachment displayed by long-term future job starts, with a transition rate into employment that much greater than that of the rest of the not-attached. Indeed, the LTFS move into employment *in the next month* at a rate that exceeds that of the unemployed, a conclusion that is reinforced for longer-term transition rates. Although the likelihood of withdrawal to non-attachment is also higher for the LTFS than for the unemployed, the overall behavior of LTFS is much closer to that of the unemployed than to the remainder of non-participants.

9. The findings relating to the M(W) and LTFS groups illustrate the difficulties associated with *a priori* reasoning and the insights that can result from the evidence-based approach. Two principal exceptions are traditionally made to the job search requirement for classification as unemployed—temporary layoffs and future job starts. In both cases the individuals are engaged in waiting rather than searching. Our analysis supports these exceptions. But how does one draw the line between these groups and others involved in waiting? Our findings suggest that the criteria for distinguishing between temporary layoffs and others engaged in similar waiting behavior (such as those in the M(W) category), and between short-term and long-term future job starts, may be too stringent.

10. These results can be applied to construct a set of alternative measures of unemployment rates. Use of these alternative rates modifies conventional conclusions about the relative unemployment experience of different demographic groups and points to the utility of considering a broader range of labour market classifications.

Overall, the results from this study are consistent with and extend findings in earlier work. These data are richer than the SJO-LFS match previously available, principally since they permit identification of a range of labor market states in both the origin and the destination months, permit analysis of time horizons beyond month-to-month, and provide data on all months in each year. We were also able to analyse the behavior of those classified as "temporary layoffs" and "long term future job starts," categories not examined in our previous work. The findings bolster the position that, for measuring labor market attachment, data on subsequent labor market outcomes can be an important and robust supplement to data on current activities.

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TABLE 1: Average Transition Rates at Various Horizons

Transitions to / Transitions from	E	U	M	N	O (=N+M)
States 1 month apart					
U	.231	.576	.058	.134	.193
	(.006)	(.007)	(.004)	(.005)	(.006)
M	.124	.214	.321	.340	.661
	(.008)	(.010)	(.012)	(.012)	(.012)
N	.035	.024	.014	.927	.941
	(.001)	(.001)	(.001)	(.002)	(.001)
States 2 months apart					
U	.319	.464	.059	.158	.217
	(.008)	(.008)	(.004)	(.006)	(.007)
M	.179	.211	.247	.363	.610
	(.011)	(.011)	(.012)	(.013)	(.014)
N	.052	.026	.014	.909	.922
	(.001)	(.001)	(.001)	(.002)	(.002)
States 3 months apart					
U	.371	.397	.057	.175	.231
	(.010)	(.010)	(.005)	(.008)	(.008)
M	.215	.202	.216	.366	.582
	(.013)	(.013)	(.013)	(.016)	(.016)
N	.063	.027	.013	.898	.911
	(.002)	(.001)	(.001)	(.002)	(.002)
States 4 months apart					
U	.409	.351	.056	.183	.239
	(.012)	(.012)	(.006)	(.010)	(.011)
M	.236	.189	.186	.388	.574
	(.017)	(.015)	(.015)	(.019)	(.020)
N	.071	.027	.013	.889	.902
	(.002)	(.002)	(.001)	(.003)	(.003)
States 5 months apart					
U	.437	.318	.052	.193	.245
	(.018)	(.017)	(.008)	(.014)	(.015)
M	.242	.181	.159	.418	.577
	(.023)	(.021)	(.020)	(.027)	(.027)
N	.077	.027	.013	.884	.897
	(.004)	(.002)	(.002)	(.004)	(.004)

Notes: Figures report average transition rates between states 1-5 months apart, based on matched LFS data for the period January 1997-December 2000. Standard errors are in parentheses.

TABLE 2: Average Transition Rates from Detailed Origin States

Transitions to Transitions from	E	U	M	N	O (=N+M)
Unemployment states					
Temporary layoffs (TL)	.474 (.027)	.410 (.026)	.049 (.011)	.067 (.013)	.116 (.017)
Job searchers (JS)	.193 (.006)	.606 (.008)	.060 (.004)	.141 (.006)	.201 (.006)
Future job starts (FJ)	.701 (.036)	.159 (.029)	.037 (.015)	.103 (.024)	.140 (.028)
Marginal attachment states					
Waiting (W)	.279 (.025)	.268 (.025)	.300 (.026)	.154 (.021)	.454 (.028)
Non-waiting (=P+D+O)	.092 (.008)	.203 (.011)	.325 (.013)	.380 (.014)	.705 (.013)
Personal (P)	.094 (.011)	.174 (.015)	.296 (.018)	.436 (.019)	.732 (.017)
Discouraged (D)	.072 (.014)	.222 (.022)	.417 (.026)	.289 (.024)	.706 (.024)
Other (O)	.110 (.022)	.259 (.030)	.299 (.032)	.332 (.033)	.631 (.034)
Non-attachment states					
Long term future job starts (LTFS)	.270 (.032)	.218 (.029)	.048 (.015)	.465 (.035)	.513 (.036)
Not attached (NA)	.034 (.001)	.022 (.001)	.014 (.001)	.930 (.002)	.944 (.001)

Notes: Figures report average transition rates between states in adjacent months, based on matched LFS data for the period January 1997-December 2000. Standard errors are in parentheses.

Figure 1
Transition rates into employment, 1997-2000

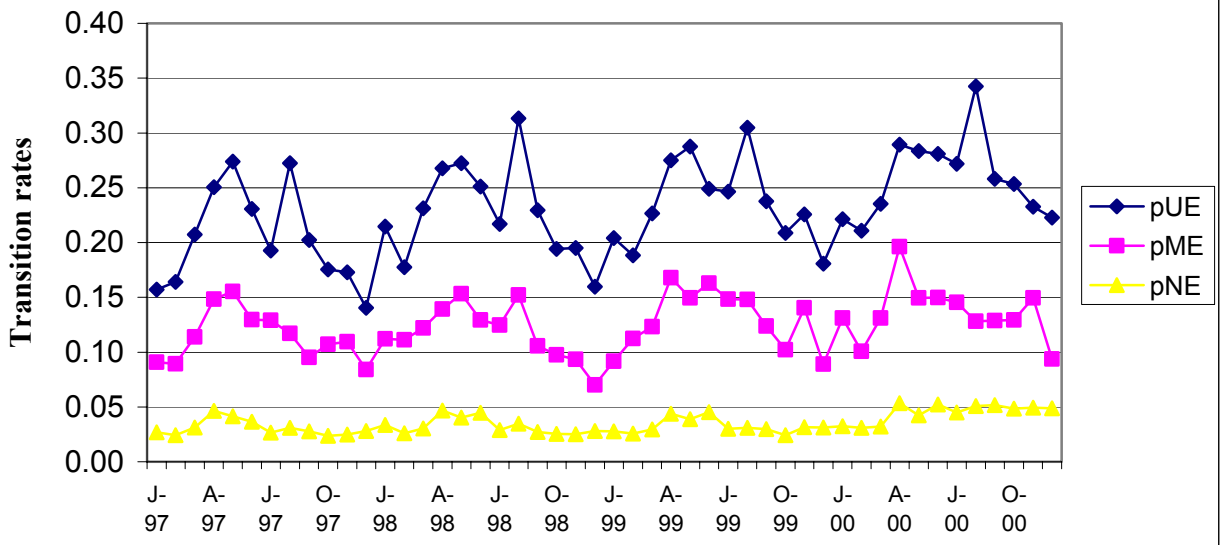

Figure 2
Average transition rates into employment and unemployment: unemployed categories

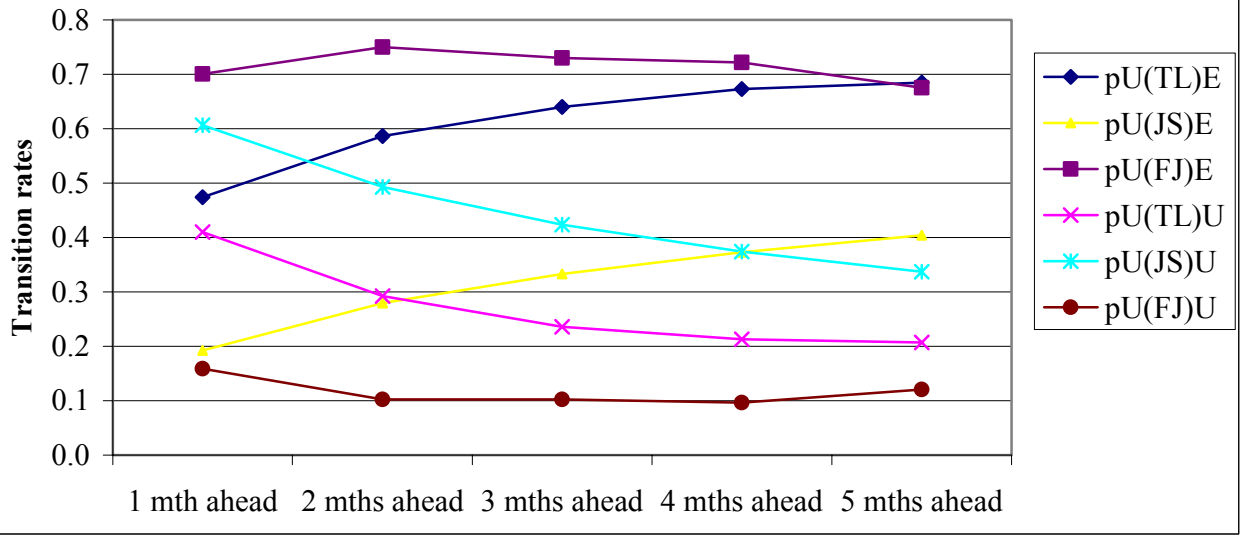

Figure 3
Average transition rates into marginal and no attachment: unemployed categories

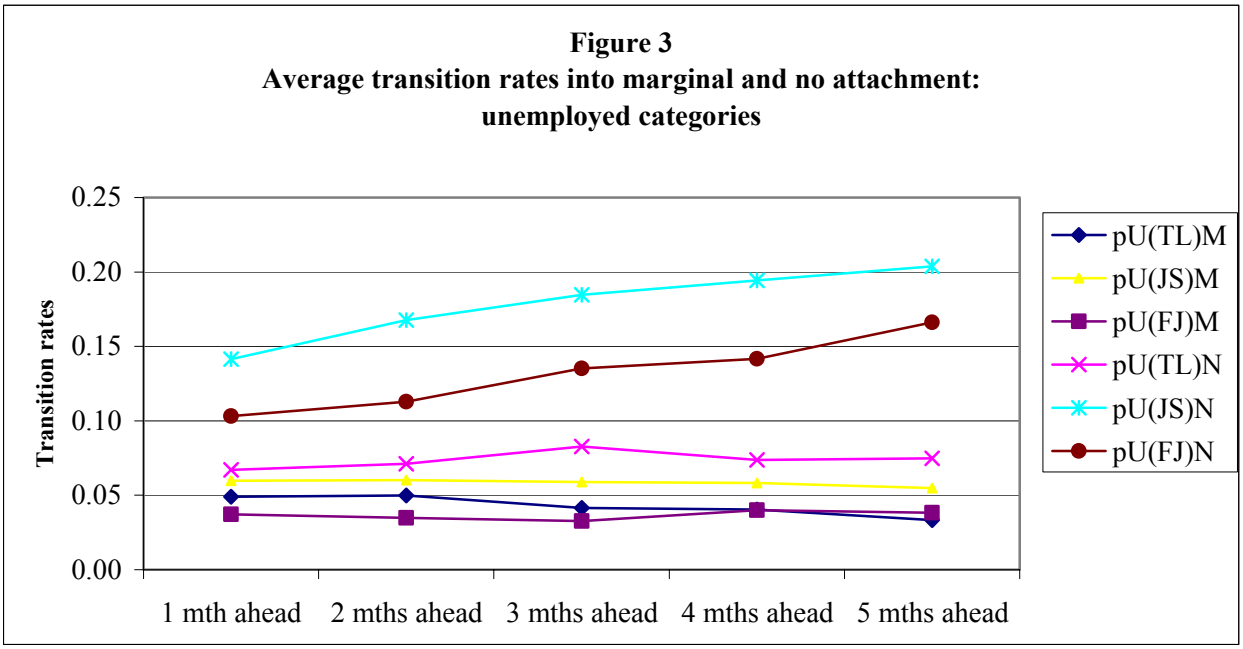

Figure 4
Transition rates into employment: marginally attached by reason for not looking

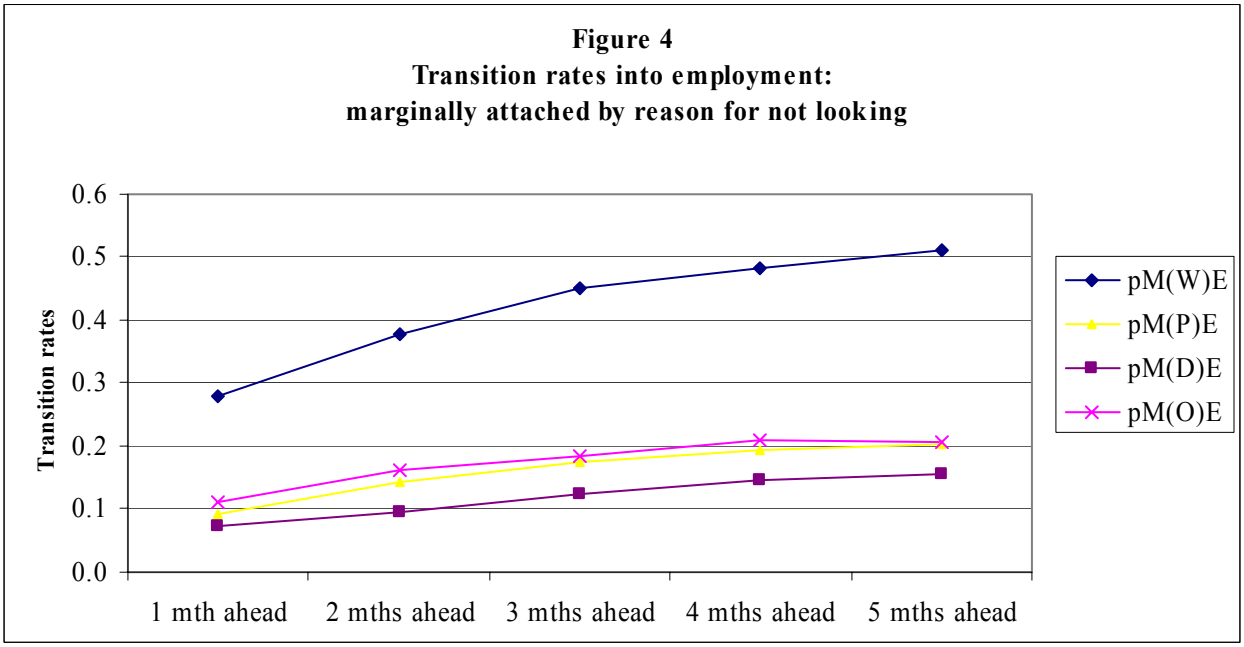

Figure 5
Transition rates into marginal attachment:
marginally attached by reason for not looking

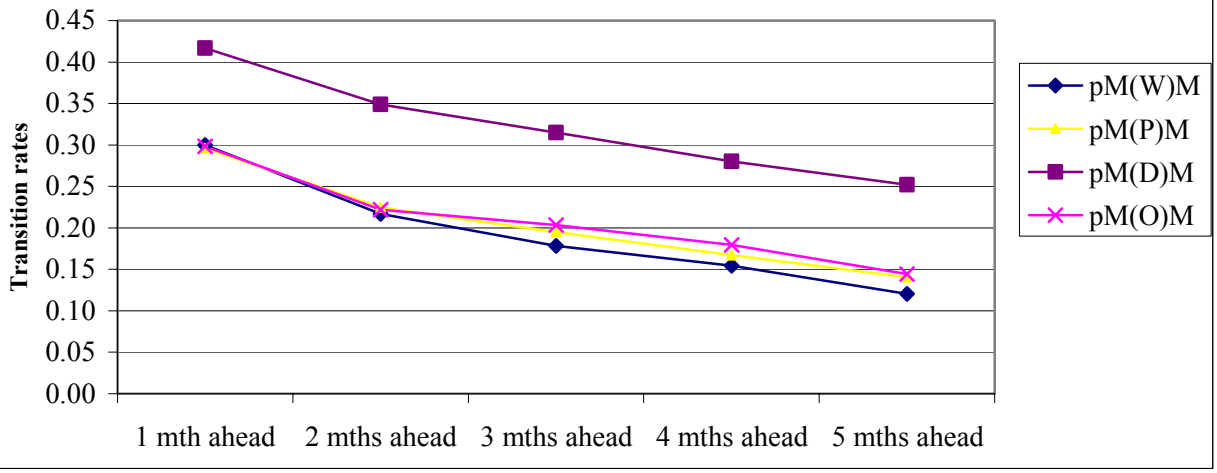

Figure 6
Average transition rates into employment and unemployment:
L.T. future start, other not attached and marginally attached